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# The Forester,

## An Illustrated Monthly Journal of Forestry

Devoted to the Conservation of Forests, the Proper Utilization of Forest Products, the Forestation of Waste-Lands and the Preservation of Game.

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Princeton, New Jersey.

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COLLECTING MAPLE SAP IN OHIO.

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# THE FORESTER.

VOLUME III. MARCH 1, 1897. No. 3.

## THE FORESTER.

**An Illustrated Monthly Journal of Forestry.**

Official Organ of the New Jersey Forestry Association, to the members of which it is sent free of charge.

THE FORESTER contains articles pertaining to all branches of Forestry: The Prevention and Extinguishment of Forest Fires, Improved Methods of Cutting, Useful and Injurious Insects and Fungi, Useful Birds, the Establishment of City Forests, State and Federal Reservations, Water Supply, Forest Legislation, Forest Influences, Forest Utilization, Forest Products, Road Construction, Reclamation of Waste Lands, etc., etc.

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Edited by JOHN GIFFORD, Princeton, N. J.,
Assisted by NEWLIN WILLIAMS and others.

IT is often remarked that forestry regulations cannot be enforced in a country where there is much individual liberty. In disavowal of this the Germans point to their neighbor, Switzerland, which is in every sense of the word a republic. In Germany, where even the city urchins are reared in the shadow of the communal forest, the systems of forest management are the result of years of hardship and experimentation. That every country must go through these experiences is unnecessary to say the least, as is shown by the Swiss foresters, who study their neighbors' methods and then modify and execute them in short order. Besides this, of course, they have ways of their own.

In the beginning forest regulations were bitterly opposed by the Swiss peasants, because their goats and cows, upon which they depended for a livelihood, were prohibited from roaming in regions set aside for re-forestation. The natives naturally cherished their pastures, many of which were located in high mountainous regions. In one place the foresters were pelted with stones; in fact, the obstacles at one time seemed insurmountable. Public sentiment has changed, and now Switzerland ranks with her neighbors in this as well as in other lines. She has accomplished more than is usually supposed. This may be due to the fact that much of the work, which is difficult and expensive, is in inaccessible places, and seldom visited except by those who, guided by foresters, have strength and nerve enough to climb extremely precipitous mountain sides.

The Swiss forester has to struggle against the intensified forces of nature. Engineering works which have been constructed at great expense may be suddenly swept away by flood, avalanche or landslide. Every bit of pasture which is turned into forest deprives some peasant, for at least a short time, of a part of his livelihood. On the other hand, the available agricultural land is so small in area and so situated that protection is necessary against the destructive forces of nature which are let loose by deforestation.

There are strong winds, avalanches, landslides and floods, but none of these are more destructive than the tens of thousands of goats upon which a large part of the Swiss population is more or less dependent.

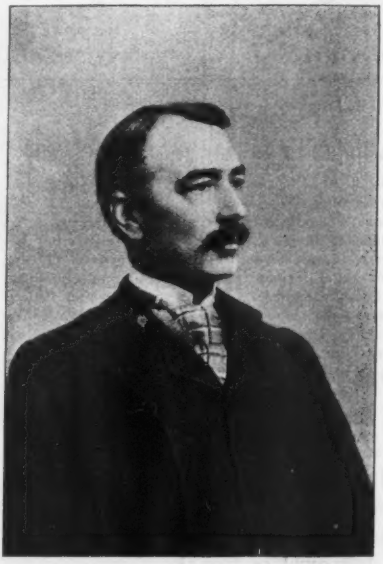
Few nations have suffered more from the effects of de-forestation, and no nation has more bravely grappled with its evil

consequences. The safety of a large part of the population depends upon the forest. In many places, by persistent work, the Swiss engineers and foresters have prevented whole mountain sides from slipping and huge masses of rock and earth from crushing the villages in the valleys. There are fields almost completely covered with huge stones, which have been started by wind, water or frost and have rolled many hundred feet down the mountain sides. Unexpectedly in the night the natives have been aroused and often injured by stones crushing through the roofs of their chalets. This has been stopped by the planting of forests. Whole mountain sides have been forested, and away up on the mountain tops, in the home of the chamois, in spite of the avalanche, they are experimenting with trees which will grow in extremely high altitudes.

Beautiful forests of beech and larch formerly existed in Switzerland, the destruction of which was a fatal mistake and an expensive but fruitful lesson.

Their boisterous streams, which are fed by perpetual snow, must be constantly watched, and the young forests planted on the mountain sides must be protected from the avalanches by walls of stone; everywhere, in fact, they are working against heavy odds and persistently wrestling with forces which are far more serious and uncontrollable than American conflagrations. By walls of stone, wattlework and a host of ingenious devices they chain these forces until the trees they have planted can gain a footing and hold the rocks and soil in place.

Although there will never be need of such expensive work in New Jersey, owing to the absence of precipitous mountains, other parts of America should profit from the experiences of Switzerland and prevent the repetition of this expensive lesson.



HON. FRANCIS H. APPLETON,
PRESIDENT OF THE AMERICAN FORESTRY ASSOCIATION.

HON. FRANCIS H. APPLETON was elected President of the American Forestry Association February 5, 1897. He was graduated from Harvard in 1869. He was for two years curator at Bussey Institute, Agricultural School of Harvard. Mr. Appleton is a native of Peabody, near Boston, and has for many years been prominently identified with associations for the promotion of agriculture, horticulture and forestry. He is President of the Massachusetts Horticultural Society, of the New England Agricultural Society, and of the Rural Club of Massachusetts, and Secretary of the Massachusetts Society for Promoting Agriculture. He is a member of the State Board of Agriculture from Essex County, and has been trustee of the State

Experiment Station and Agricultural College. He was a member of the Messachusetts Legislature in 1891–92. The Association has done well in selecting a man who has served in several similar positions, an influential worker and a native of the State which usually leads in similar reforms.

### Minor Forest Products.

II.—MAPLE SAP.

One of the most pleasing sights a tourist meets with during a summer in Northern New England is a great grove of the beautiful round-topped sugar maples growing on the sunny slope of some mountain. If the tree growth be not so dense as to hide it he may see the "sugar-house" in the lowest part of the orchard, sometimes with simple wooden troughs running toward it down the slopes from different parts of the orchard, the troughs being used to empty the sap at a point near the place of collection, the declivity allowing it to run to the sugar-house by gravity and to be collected in the storing vessels.

To walk through one of these "bushes" in the cool mountain air is a keen delight to a lowlander, for the summer carpets the barren ground with masses of sweet-scented fern wherever the sun gets a chance to shine through the dense leafage, and the finely cut fronds, curved with a peculiar fragile delicacy, surround the granite boulders which lie in gray silence under the deep green of the trees.

The growing of maples as a source of profit is practiced in the northern sections of our country, where the peculiar conditions suited to the production of a desirable quality of sugar obtain. The planting of tracts in more southern latitudes on land not so available for other purposes would appear to be a valuable investment, if only for the wood, which is much prized for its indoor furnishings, and commands a high price, both in home and foreign markets. The sugar harvest would come at a time of year when little else could be done on the farm. The quality of sugar produced in more southern latitudes seems, however, to be a matter of uncertainty. A New England gentleman, who is a connoiseur on maple sugar, avows that the higher the latitude and altitude of the producing trees (up to a certain limit, of course), the higher the natural flavor of the product. He speaks of sugar made in the Catskills as insipid.

In planting maple trees for sugar production it is best to leave ample space for each tree, as the productiveness depends upon the amount of leaf, or rather twig, surface that is exposed to the spring sun. In planting a tract for timber, however, the trees may be set in more crowded fashion, since when grown in this manner they will form tall, straight boles before branching into a leafy top.

I am not surprised to learn from my New England friend that sugar-trees, like garden plants and domestic animals (and, indeed, human kind), respond to *care*: that by certain little sympathies and attentions the Vermonter, who, by careful boring, trimming off the brush, and what not, gets a more generous response from his trees and a more vigorous growth through his whole orchard than the man, his neighbor, who thinks of his trees as so many pounds of sugar per annum, and never looks at them out of season.

Investigations upon the flow of sap have been made during the last few years by Messrs. Wood, Morse and Stone, at the New Hampshire State Agricultural College (Durham), one of their aims being to determine the flow of sap from different depths of the wood. After a long series of careful observations, taking into account the time of flow, the quantity of sap and the percentage of saccharose from different depths, they have summed up the results of their experiments in the following statements (Bulletin 32); "The results obtained in these studies upon the flow of sap tend to show that more sap flows from a deep hole than from a shallow one. The exact depth to which a hole should be bored is unsettled, and may prove to depend on the size of the tree. The longer flow of sap from the inner wood agrees with the practice of re-tapping trees toward the

close of the season. The results obtained by studying the composition of the sap from different depths of the trees are still contradictory * * * inasmuch as two trees yielded the richer sap from the outer wood and one tree from the inner wood. The results, however, are in accord with the statement that the more sap there is produced by a tree the greater is the yield of sugar." It is also interesting to note that at the station "the soil is a clay loam with a clay subsoil and overlies granite ridges."

On the other hand Mr. Timothy Wheeler, of Moscow, Vermont, who is a practical maker, and who has experimented over so long a period as to give much weight to his testimony, comments on the matter in a recent letter as follows:

"I have made very many experiments with maple trees and their sap, having experimented every spring for seventeen years. One of my experiments was to have an inch auger hole six inches deep collecting the sap in separate vessels from each of the two inches and evaporating equal quantities to sugar and then weighing each batch.

"I found that the fifth and sixth inches of the section of the bore gave me a sap deficient in the sugar element to the amount of one-half, for it took just double the amount of sap to make an amount of sugar equal to the amount the first two inches made.

"I have boiled equal quantities of sap from all parts of trees, up as high as forty feet and down on roots for fifteen feet. Sap is not homogeneous in all parts of the tree.

"If a sweeter sap has ever been taken from the heart wood, or duramen wood, as the botanists call it, than from the alburnam wood, then this must be an exception to the law.

"Whoever bores four inches deep for sap must of necessity make an inferior grade of goods.

"As a rule, we Vermonters bore from one inch to one inch and a half, varying with the size of the tree."

It is said by one versed in the matter that New York has outdone Vermont in the production of sugar within the last few years. Some of the larger growers, especially in the Catskill region, having an output of from five to seven thousand pounds per average season. These makers use the tube evaporator, which consists essentially of a long coil of pipe-heated as the sap flows slowly through it. The sugar produced by this process is pale and solid, but has suffered a loss of the so-called "maple" flavor, which is greatly deprecated by many consumers.

Mr. Wheeler has tried methods of sugar making, introducing processes to prevent the precipitation of nitre, but his efforts in this direction have as yet proved unavailing. In his letter he says:

"As yet we do not know what the true maple flavor is. Now we only get a fraction of the maple or natural flavor.

"I have studied and experimented somewhat to see if it was not possible by some method now unknown to us to reduce sap down without having these two elements (*i. e.*, lime and malic acid) combine, so that we would have the true maple flavor and all of it.

"The malate of lime, burning on the bottom, colors (by burning) all the syrup that passes over it. This gives it an unnatural flavor which we call the true maple flavor, though it is not. I want to get the malic acid into our goods. Who can tell how it can be done?"

It is quite possible that the peculiar taste and quality of maple sugar and syrup are not due entirely to malic acid or any of its salts. It may be due in part to products evolved in the boiling by contact of the heated sap with the air, but is probably due in part also to subtle and elusive qualities, some of which withstand the severe test of evaporation. Vegetables are highly organized beings, the secrets of whose life-doings are as obscurely hidden as those of most animal processes, and the chemist is not a whit nearer the secret when he has accounted for the last ponderable fraction of the juices or tissues by name and by weight.

We know how, of late years, the witch-hazel has found a welcome place in every home on account of its inclusive therapy; but the chemist has been unable to dis-

cover any principle in it save a little tannic acid and a peculiar, characteristic odor. The fox-glove of Europe has been used in medicine from time beyond record, yet the more it is studied the less the theraputists are able to definitely ascribe its valuable action to any of its recognized constituents. Why can we not say the same thing of maple sap? Some method might be devised for removing the lime by means of oxalic acid, alkaline carbonates or other agents, yet it is probable that some subtile property or principle would be disbalanced or decomposed and the maker would be no better off in the market than in the days when he allowed the nitre to settle from the syrup on cooling.

Some members of the New Jersey Forestry Association may have seen a man who, twenty years or more past, traveled on the Delaware Valley lines of the Pennsylvania Railroad, bent on selling maple sugar. His article was so much in demand that he made a comfortable fortune in selling it, which having been accomplished he immediately invested his accumulations in the oil bubble, then inflating, and lost it to a dollar. Where he got the crude sugar is not known, but by some process, either borrowed from New England or original with himself, he clarified it, moulded it, and sold it in pairs of oblong cakes done up with colored papers into attractive packages. Olk folks and children alike confessed that they knew no such delicious morsel. The sugar was dark colored, hard, dry, brittle and *free from grit*, of fine strong flavor and as clear as the red and yellow candies so popular to-day with the children at the holidays. The secret seems to have perished with the man, for none have seen so choice a product before or since. If the secret of the process should be recovered, even though not practical for gross use, it might prove a means of suggestion to producers, and put them on the way toward removing or circumventing the disagreeable "sand" (nitre) without deteriorating the qualities which make their goods marketable.

Sugaring time is a season of festival in northern New England and Canada—a harvest-home celebrated at the opening of spring with general rejoicing. The Mediterranean countries hold their vintage-fetes, dancing about the wine press and revelling in the luscious, but still harmless must. Our Eastern and Southern States have (or had, when life was simpler than now) their huskings and apple-pairings, with cider for beverage. In the Lake States the girls and boys look forward to the "sugaring off" time when they will be enjoying the delicious sheets of maple-sweet picked from the beds in the snow, where it has been poured to harden from the stiffening mass in the pan over the fire in the cabin.

NEWLIN WILLIAMS.

According to the *Indian Forester*, Casuarina equisetifolia, a tropical tree, has been extensively planted on sand dunes in India. It grows within five yards of salt water, and although exposed to the full force of the southwest monsoon winds, is not in the least stunted. Trees twenty years old are from sixty to ninety feet high.

One of the most lamentable losses due to the fire in the capital at Harrisburg was the destruction of five-sixths of the edition of Dr. Rothrock's report on forestry. The Legislature of Pennsylvania being fully aware of the importance of this work will no doubt at once proceed to republish it.

In spite of numerous native species, the formation of locust (Robina pseudacacia) plantations is being agitated in India. This extremely valuable and interesting tree is rapidly spreading around the world. It is probably a native of the Southwestern United States.

Charles A. Keffer, Assistant Chief of the Division of Forestry, has been appointed one of the editors of *Forest Leaves*, the official organ of the American Forestry Association.

"Timber," a bulletin by Mr. Filibert Roth, of the Forestry Division, has been translated into French.

## Irregular Woods in the Black Forest.

BY KARL PHILIPP, FORSTASSESSOR, HERRENWIES, BADEN.

Within the last few years the efforts of the friends of the woods have been crowned by many good effects in the United States, and many people are becoming convinced that the devastation of woodlands cannot continue long, and that the time is near at hand for important changes. In nearly every State a few Americans have commenced the study of forestry with much energy and insight. Most of our American colleagues have already worked in the forests for a long time, and have acquired a good stock of practical knowledge in many branches. The various systems, however, under which extensive wooded territories are to be managed cannot be learned in the United States, where forestry is still a new science, therefore a visit to the European, especially German, forests will be the best way for an American to become acquainted with the different methods of forestry, in order to discover the ones best adapted to the forests of America, the preservation and amelioration of which will be later his special study.

In the beginning the visitors to our forests will be surprised at the proper proportion and distribution of the age classes into different compartments, the small number of species and the great expenses for planting and for road building. For a time the work of the forester in America must differ from that of his European colleagues. The stock of his woods consists of a greater number of species, the forest behavior of which is not sufficiently known, the age classes are irregularly mixed, and for forest planting and the construction of roads he will have very small means at his disposal. We manage our forests by systems based upon the forestal qualities of our trees already known to us. The American, however, must first inquire into the qualities of the native species and adapt the management to the results. The study of the German forests will be most profitable to the American, if he visits in the beginning woods in which the irregular stock of trees is to be gradually transferred into a regular forest, or woods in which the irregularity is to be preserved as a special feature of the treatment. Here he will find the best opportunity to observe the behavior of the different species of trees in a comparatively small area, under all possible conditions which are produced by the elevation above sea level, the productiveness of the soil, the mixture of species and age classes, the density of the growing stock, etc., and of learning the measures by which, in irregular, open woods, the normal stocking may be retained and the fertility of the ground preserved and increased.

As types of irregular mountain woods I shall mention some examples of the Black Forest and describe the way in which these woods are tended.

The forests in the valley of the Kinzig* and its small tributaries constitute the largest territory in Germany, where the irregular conditions of the growing stock are preserved in a systematic and exemplary way. The manner of cutting is named "*femeln*;" the woods are called "femel woods." These are forests where all age classes are irregularly mixed together as single individuals, or, what is to be preferred, as groups in small areas. In external appearance the "femelwald" resembles therefore the primeval wood. In all other sylvacultural systems the different age classes are assigned to certain areas, which facilitates the treatment of large forests. For instance, in a normal pine woods of one hundred acres, subjected to the clear cutting system with a rotation of one hundred years, one acre is stocked with plants one year old, another acre with plants two years old, and so on. In a femel-wood one finds plants aged from one to one hundred years, mixed in groups together on every acre. One who is not versed in the secrets of the management will consider the femel-

*The Kinzig is one of the many streams flowing with precipitous haste into the Rhine, not far from Strassburg, draining the slopes of the Black Forest mountain region. It rises near Freudenstadt, a town of Wurtemburg, across the Baden frontier, and flows thence south and west, dividing the Black Forest into two distinct parts. The valley of the Kinzig is fertile and populous, and one of the most picturesque and prosperous regions of the famous Schwarzwald. Many famous resorts are located there, although the peasants have retained their old-time customs and dress.

wood a chaotic mingle-mangle of trees. The forests in question here occupy the slopes of the mountains bordering the valleys of the Kinzig and the brooks it receives, elevated from 300 to 900 metres above the sea. In the lower parts granite is the principal rock. The upper parts belong to the sandstone formation. At the line where granite and sandstone meet there are numerous springs, so that one finds in the lower parts a deep, moist, fertile ground and well developed trees. The average productiveness of the soil is good. Measurements of sample plots have proved that the current annual increment amounts to an average of eight cubic metres of wood per hectare (1 ha. = 2½ acres) per annum. The growing stock is composed of the following species: Silver-fir, 60 per cent.; spruce, 30 per cent.; beech, 8 per cent.; pine, 2 per cent. In the lower parts there is often an admixture of oak. The Silver-fir is the best coniferous tree for the femelwood, because it surpasses the other species in qualities which are absolutely necessary for the methodical introduction of this system. First, it is distinguished by a great faculty of enduring shade. It is generally conceded, and, in fact, has been ascertained by numerous investigations, that young silver-firs, suppressed in the beginning, have reached their full development after the removal of the old stems. If, therefore, for any reason, the cutting in a compartment must be postponed or diminished, the forester may be sure that the undergrowth will not suffer any serious irreparable harm, and will recover as soon as the stock is again opened more freely. Another excellent quality of the silver-fir is the tenacity and rapidity with which wounds and mutilations heal. Though cutting may be done with the utmost care, the young undergrowth will always be more or less injured by felling and removing the large trees. Wounds occasioned by stripping off pieces of bark soon close and seldom cause foul spots in the stem, and broken tops are replaced by lateral branches. As further favorable but subordinate qualities we must take into consideration that:

1. Full masts occur at short intervals, and natural regeneration is easily secured whenever the cuttings are conducted in a cautious way;

2. Its root system is very strong, so that damages are not often caused by wind;

3. The stems are very regularly shaped, no other coniferous tree having the same high form factors;

4. As to the density of the growing stock no other species equals it. The soil is therefore always well shaded, which prevents the growth of forest weeds;

5. It thrives moderately well in localities of very unfavorable conditions, such as rocky slopes and dry ridges;

6. It is very slightly affected by obnoxious insects.

The *Spruce* in the lower parts is always mixed with the silver fir, which predominates there. The percentage of admixture increases with the elevation. The maximum development of the spruce will be found at from seven hundred to eight hundred and fifty metres above sea level. From eight hundred metres it is the prevailing species. Humidity of the soil and the air are necessary for a good growth of spruce. Therefore, ascending in the mountains we find the first pure woods of spruce in moist ravines and all localities inclined to get swampy. The roots of the spruce are not so strong as those of the silver-fir. Winds will therefore do more damage. This disadvantage, which may render natural reproduction very difficult on flat, moist grounds, is of little matter in the mountains, the slopes of which are mostly covered with rocks. Here the trees are well anchored by their roots, which penetrate into all fissures and crevices of the stones. Natural regeneration of the spruce in such regions is therefore not difficult.

The young spruce is inferior to the young silver-fir in the faculty of enduring shade, but surpasses it by a much greater height-growth during the first twenty years. In the irregularly stocked open woods, which are in the seeding stage, we find the young spruce trees

in abundance on all the larger clearings directly exposed to the sunlight, while the young silver-fir seedlings settle in gaps and small openings, or at the boundaries of the clearings in the shadow of the parent trees. It is evident that a skilful forester will gain advantage from the difference in the behavior of these two species by regulating the size of clearings in order to get the desired mixture of silver-fir and spruce. Because of the rapid growth of the young spruce it is used to great extent in planting small clearings by means of which method troublesome weeds are soon subdued. If the systematic natural reproduction of our mixed coniferous woods were not disturbed by wind-falls or snow breakage the silver-fir would soon gain a large and constantly increasing proportion of the soil. Employing spruces nearly exclusively for planting of such areas the propagation of the spruce and the silver-fir is kept in the proper proportion. The beech is always a very desirable factor in the mixture since it furnishes rich masses of leaves, keeps the soil well shaded, prevents the sprouting of forest weeds and parching of the soil. The beneficial influences of the beech in natural regeneration is well known and appreciated. Pure irregular silver-fir woods need no mixture of deciduous trees in order to preserve the productivity of the soil. The greater the percentage of spruce, however, the more the beech must be regarded. During the long winter months, with abundant snow falls and quick changes of temperature, the beech renders very valuable services. When the conifers are mixed with and surpass the beech in height, depending upon their age and the conditions of the soil, they have in every direction equally expanded branches and are therefore less damaged by snow than in pure regular stocks where the trees are often irregular in shape and are consequently much injured by snow. In addition to this the beeches being free from leaves, offer no obstruction to the snow.

The *Pine* plays a very subordinate role on soils of good condition, and therefore needs no further explanation. In order to prove how cautious one must be in examining and discerning the qualities of our forest trees, let me say in this connection that the pine (*P. Sylves tris*) of the Rhine Valley is mostly crooked, while the pine of the Black Forest nearly equals the spruce in straightness and taper of the stem, and surpasses it in the price received for the higher stem classes.

[TO BE CONTINUED.]

### Symbiosis.

There is a peculiar state of existence in nature called *symbiosis*. When one plant such as the mistletoe seeks nourishment from another without giving anything in return to its host, it is true parisitism. Often, however, two plants may grow together and both be benefited by the partnership. Foresters who deal with the giants of the vegetable world must not forget the influences for good or evil exerted by the minute forms of plant life. Although injurious forms deserve attention, the beneficial kinds should not be entirely disregarded. Besides the bacteriods which are great conservors of nitrogen on the roots of leguminous trees, enabling them to endure, in fact thrive on sterile soils, recent investigations show that one of the most important ingredients of leaf-mould is the mass of mycelial hyphæ of fungi which permeate it. These minute filaments cling to the rootlets of trees, and by their capillarity aid in rendering available to the tree the materials resulting from the decomposition of vegetable matter, which in turn is caused by microbes, the minutest forms of life. In return, it is claimed these microscopic plants receive some nourishing materials from the tree which have been assimilated through the leaves and which they are unable to secure in any other way, being hidden from the light. The beech, the tree cherished above all others for an underwood by the Germans because of its beneficial influences on the soil, is, it is claimed, dependent to a very great extent upon the filaments of fungi in the soil.

Locust leaves (*Robinia pseud-acacia*) are devoured with avidity by sheep and cattle.

**Forestry at the Dominion Experimental Farms.**

BY W. T. MACOUN, FOREMAN OF FORESTRY, CENTRAL EXPERIMENT FARM, OTTAWA, CANADA.

The experimental farms system of the Dominion of Canada, was organized in the year 1887, since which time much valuable work has been done in many branches of agriculture.

One of the objects for which these farms were established was to carry on experiments with forest trees, both for timber and shelter purposes. As the farms were situated in five different provinces of the Dominion, where the climate and other conditions differed widely, the experiments conducted have necessarily varied also. The work accomplished and the information gained during the past ten years have been considerable, and should prove very useful to settlers, both in the old and new parts of Canada.

At the Central Experiment Farm, which is situated near Ottawa, in the Province of Ontario, about twenty-one acres have been devoted to the growing of forest trees, which have been planted in belts along the northern and western boundaries of the farm. In the year 1887 a large number of young timber trees of the best and hardiest species were procured and planted in nursery rows. During the spring of 1888 the work of replanting these in permanent positions was begun and continued, at intervals until the autumn of 1894, when the belts were completed. These trees were planted for several objects, among the most important being to test the advantages and disadvantages of planting trees at different distances apart; to gain information regarding the growth of the trees when mixed, as in natural conditions, or grown in blocks of a single species; to determine the relative growth of the different species, and to find what influence these belts would have as wind-breaks on the crops grown in their vicinity. The trees in these belts have for the most part, made very satisfactory growth, and are valuable object lessons to persons contemplating the planting of forest trees. For several years a free distribution of young trees, shrubs and cuttings was made from the Central Experimental Farm to applicants living in Manitoba and the Northwest Territories. More than 400,000 were sent out in this way; cuttings of hardy poplars and willows being made a specialty. From reports received many of these have done well. Seeds of several species of hardy trees and shrubs were also sent to settlers in these provinces, but as soon as the branch experimental farms were in a position to supply young trees, shrubs, cuttings and seeds grown in Manitoba and the Northwest Territories the distribution from the Central Experiment Farm was discontinued. Notes and measurements are taken of the various species, and much valuable data has already been recorded.

The experimental farm for the maritime provinces is situated at Nappan, Nova Scotia. The experiments conducted with forest trees there are along the same lines as at the Central Experiment Farm, though on a smaller scale.

The work done in the prairie provinces of the Dominion has demonstrated the practicability of growing many trees which, hitherto, it was thought would not withstand the severe winters and summer droughts which are experienced there, and has led the settlers of those provinces to determine for themselves the great advantages derived from planting trees on their farms.

In the year 1888 work was begun at the experimental farm for Manitoba, which is near the town of Brandon, and about 130 miles west of the city of Winnipeg. This farm consists of rolling ground, and is a good example of land of that character throughout the province. A few native species of trees and shrubs grew in the sheltered ravines, but that part of the farm exposed to the winds was destitute of them. A belt of trees was planted along the western boundary of the farm, and the soil kept well cultivated throughout the growing season. It was found that a large proportion came through the winter in good condition; the gaps were filled by hardy native species (Negundo aceroides; Fraxinus viridis; Ulmus Americana), and other belts planted from time to time. The

species less able to withstand the rigors of the climate have been interspersed among the hardier sorts, until the number of species growing at this farm has increased far above the most sanguine expectations. As soon as the trees growing on the farm were large enough to propagate from, cuttings were taken freely from the poplars and willows and distributed gratis to the settlers who applied for them. Seed of the native trees was also gathered, part of which was disseminated in the same manner as the cuttings and part sown on the farm, the seedlings being used for planting there and also for the further benefit of the farmers. Applicants for these trees, cuttings and seeds were supposed to report on the results of their test of them.

Another valuable line of work was the enclosing of plots of ground of various sizes with hardy trees and shrubs, which has proved of great benefit, both as a means of conserving the snow, and thus increasing the moisture in the soil during the growing season, and also by protecting the less hardy fruits and ornamental trees and shrubs from the biting frosts of winter.

In the selection of an experimental farm for the Northwest Territories, the object was to procure one in such a locality as would be of service to the greatest number of settlers widely scattered in that vast country. The greatest population was in the eastern part of the territories and the farm was chosen at Indian Head, scarcely two hundred miles west of Brandon, but having a climate and landscape so different from that place that work done there would be under entirely different conditions from that at Brandon. The climate at Indian Head is dry, the land very level, and no tree at that time broke the monotonous outline of the prairie. There seemed a poor prospect of much being done in the way of successful tree planting there, but some thousands of northern grown trees were obtained and planted in belts and nursery rows; seeds of native species sown and a good start made. Most of the foreign trees introduced the first year died, doubtless partly owing to the drought, and partly owing to the severity of the winter, but the native sorts grew well and as the protection they afforded was increased year by year foreign species were able to thrive and better withstand the extremes of drought and cold. Similar experiments have been conducted here as at Brandon, though a more limited number of species succeeded than at the latter place. An annual distribution is also made at Indian Head of trees, cuttings and seeds.

The experimental farm for British Columbia is situated on the mainland at Agassiz, near the Fraser river, and is about seventy miles east of Vancouver City. The growth of timber trees in the forests of that section of the province is vigorous and the trees grow to be a very large size and great height. The climate is temperate and adapted for growing many species. On account of the great area of land in timber the testing of native trees is not yet made a prominent feature of the work at this farm; but the hard wood trees of Eastern Canada and other countries are being thoroughly tested with a view to the growing of hard wood timber in British Columbia, as there are few hard wood trees native of that province. Another important feature of the work is the growing of the edible nut-bearing trees of Canada, the United States and other countries, to determine what nuts can be produced there and whether a profitable market can be obtained for them. Shelter belts have also been planted as at the four other farms, and the trees in these are doing well.

"The Arabs who inhabit the valley of the Jordan invariably *put to death* any person who is known to have been even the innocent cause of firing the grass; and they have made it a public law among themselves, that, even in the height of intestine warfare, no one shall attempt to set his enemy's harvest on fire."—*Burckhardt's Travels in Palestine.*

The Christmas Tree.—An ingenious contrivance for the destruction of thousands of beautiful young evergreens and for burning children and houses.

**The Division of Forestry, Department of Agriculture, Washington, D. C.**

The report of the Chief of the Division of Forestry on the work done during the fiscal year ending June 30, 1896, shows that the Forestry Division cost the people of the United States during that time the small sum of $25,906.69. The personnel of the Division at present comprises the Chief, Assistant Chief, dendrologist, one timder expert, one field agent and one computer, besides several clerks. The salaries of these six experts, men who have been years in learning their profession, besides being naturally gifted, amounts to the meagre sum of $9,800.

At present the work of the Division is "confined to the gathering and diffusion of such information as may promote interest in the subject and to original investigations the results of which will lead to a wiser use of our existing forest resources or will be helpful in carrying on forest management when the time has come for it. A knowledge of the life history of our timber species, the conditions under which they develop best, the rapidity with which they grow into useful material, are subjects for such investigations, while a more intimate knowledge of the characteristics, strength, and behavior of our wood materials should lead to much needed economy in the use of our existing forest resources."

Considering the small amount of money used the Division has accomplished a very great deal. That the work has been well done there is no room for doubt in spite of the fact that the officers of the Division have been hampered in many ways. In addition to this, however, it should have some practical forest administrative work; in fact, it should be charged with the management of every acre of forest or waste-land owned by the Federal government.

Besides the collection of an immense amount of data in reference to the growth of white pine and other timber trees which will be of great value for the inauguration of the American systems of forest management, important investigations are in progress in connection with western experiment stations. This work is similar to that in progress in Canada, which is described on another page of this journal by Mr. Macoun, of Ottawa. In referring to these experimental forest plantings the report says:

"By an arrangement with the authorities of the State experiment stations at Manhattan, Kan.; Lincoln, Neb.; Brookings, S. Dak., and Fort Collins, Colo., the Department has obtained control of lands upon which to carry on forest planting experiments. As a result there have been planted this spring, at the four places, twenty-seven acres, with one hundred thousand plants of twenty kinds, and in addition a nursery for the supply of plant material for future needs has been established in Lincoln, and some twenty-five additional species have been planted to test their adaptation to the climate at the several stations.

The object of these experiments is twofold, namely, to demonstrate the proper methods of forest planting, which differ from those of orchard, park and nursery practice, including the determination of desirable mixtures of species, and also to test the adaptability of different species for different conditions.

This work has been carried on under the immediate charge of Mr. C. A. Keffer, assistant chief, who has had experience in this direction when professor of horticulture and forestry at Brookings, S. Dak. The Department provides the plans, plant material and labor, and the professors of horticulture at the institutions mentioned co-operate free of charge in attending to the setting out and cultivating of plants and to the carrying out of the plans proposed by the division.

Although $5,000 had been set aside for this work, it was found that less than half that amount ($2,144.29) would be sufficient to make a beginning, especially as it seemed desirable to "underplant" some of the existing groves at the stations rather than extend them, and thus demonstrate the value of an undergrowth.

Seeds of holly (*Ilex opaca*) have been sent to Holland and France for experimentation on sand dunes.

### American Forestry Association.

The fifteenth annual meeting of the American Forestry Association was held in the Cosmos Club Hall, Washington, D. C., February 5th. It is not customary for the annual meeting to be largely attended, as it is devoted almost exclusively to routine business, but this was one of the most successful in the history of the Association, both in point of numbers and interest. Mr. J. Sterling Morton, Secretary of Agriculture, is the President of the Association. He was unable to be present, and Mr. Gardiner G. Hubbard, Vice President for the District of Columbia, presided. The following committees were announced:

On Nominations—Messrs. French, Bowers, Fox, Gannett and Binney.

On Constitution and By-Laws—Messrs. Higley, Whittlesey and Moses.

On Resolutions—Messrs. Appleton, Gifford, Barnard and Keffer.

To Audit the Accounts of the Treasurer—Messrs. Fox and Sudworth.

The report of the Executive Committee, which appears elsewhere, was read by Chairman Fernow. It opened a discussion which took a wide range. Messrs. Bowers and Fernow, of the committee, suggested the appointment of an entirely new committee, the majority of whom should live in New York, Boston, or Philadelphia, as gentlemen from some other city might be more successful in shaping legislation before Congress. This idea found little favor with the members present, as appears in the election of officers. The status of bills in Congress was considered, and it appears there is no hope of securing the passage of a bill for the protection and management of the forest reservations at this session.

A new Constitution and By-Laws was adopted, to conform to the articles of incorporation, the Association having been incorporated during the year. An invitation from Nashville to hold a meeting there during the Tennessee Centennial Exposition was favorably considered and referred to the Executive Committee for arrangements and date. The election of officers resulted in choice of General F. H. Appleton, of Boston, as President; Messrs. E. A. Bowers, G. G. Hubbard, George P. Whittlesey, Nathaniel Wilson, B. E. Fernow, Washington, D. C.; F. H. Appleton, Boston, Mass., and H. M. Fisher, Philadelphia, Pa., Directors. The remaining officers were re-elected save in a few instances. Mr. John Birkenbine, Philadelphia, was named on the Executive Committee, and new Vice Presidents were elected as follows: S. C. Mason, Manhattan, Kan.; J. D. W. French, Boston, Mass.; John Gifford, Princeton, N. J.; John R. Proctor, Frankfort, Ky.; J. B. Thoburn, Oklahoma.

The Committee on resolutions presented the following, which were adopted:

*Resolved*, That, reiterating our support of the McRae bill, H. R. 119, to protect and administer the public forest reservations, which passed the House of Representatives at the first session of the present Congress, we deplore the seeming impossibility of its being taken up in the Senate during the current session, and emphasize our regret that slight personal differences of opinion should operate to stay the passage of legislation so clearly designed to inaugurate a national system of forest preservation and management.

*Resolved*, That as a fundamental proposition of rational forestry, we commend the well organized effort of the State of Minnesota to suppress forest fires, being aware that no advance can be made in forest management without such protection.

*Resolved*, That we urgently recommend that the Federal and State authorities take measures to encourage the study of forestry in all agricultural colleges, technical and normal schools throughout the United States, and we hope that the Forestry Committee of the National Academy of Science will not only favor legislation similar to that advocated by this Association, but will embody recommendations looking toward the establishment of means of education as herein suggested.

*Resolved*, That the American Forestry Association expresses its hearty approval of the efforts heretofore put forth, or which may be hereafter made, on the part of the several States to establish

State forest reservations. The States of New York, Pennsylvania, New Hampshire, West Virginia and Minnesota have under consideration in their several Legislatures for the enlargement or establishment of such reserves. The friends of forestry everywhere should view these efforts with sympathetic interest, and further such legislation in every possible way.

The report of the Secretary and Treasurer showed a healthy increase in membership, and a sound financial condition. There are now two patrons, seventy life members and six hundred and thirty-three annual members of the Association. During the year an effort has been made to collect membership dues in arrears, which has not only increased receipts, but has strengthened the active membership.

The Treasurer's report shows a permanent fund of $2,500 invested in five per cent. bonds. The receipts of the year were $1,248.39; expenditures, $1,359.61, leaving a cash balance, in addition to invested funds of $253.18.

In the evening a joint session was held with the Geographical Society, of Washington, the session being devoted to a lecture by Mr. B. E. Fernow, Chief of the U. S. Forestry Division and chairman of the Executive Committee of this Association. A large audience greeted the lecturer in spite of the inclement weather, and it was well repaid for braving the storm.

Dr. Fernow spoke on the Forests and Deserts of Arizona, and gave a vivid description of an extended trip through that territory. It was a surprise to most of his hearers to learn that there is one body of pine forest over 3,000 square miles in extent, in what is commonly thought the desert territory, and the lumber operations there were equally astonishing. Many beautiful views illustrated the lecture, which closed with a brilliant description of the Grand Canon of the Colorado River.

### Report of Executive Committee of the American Forestry Association.

In all reform movements which, like our forestry movement, involve change of economic thought and methods, there are times when progress can hardly be noted by definite events and tangible steps of advancement and yet progress is made without special effort, insensibly, by an almost imperceptible broadening of appreciation of the subject, a result of the momentum of earlier efforts; the front may not advance, but more batalions move into line.

The past year may perhaps be considered in the history of the Association as such a time of bringing up arrears, of broadening interests, of movements into line and reaping results of its influence rather than achieving advances on given lines.

As the most notable of these movements may be mentioned the appointment of a Forestry Committee by the National Academy of Sciences, which was secured through the efforts of your Executive Committee by inducing the then Secretary of the Interior to ask the advice of the National Academy—the legally constituted advisor of the government in matters scientific—regarding the proper steps to be taken with reference to the public timberlands.

An appropriation of $25,000 was readily secured from Congress for this committee to enable its members to inspect the condition of these timberlands as a basis for its recommendations. It is known that such inspection was made and a report is preparing, although we are not informed of the drift of its recommendations. Your committee in securing the appointment of this body did not expect that its recommendations would be essentially or strikingly different from those made and advocated by your Association, but hopes that the weight of the opinion of the eminent gentlemen composing the Forestry Committee and of the body from which it was selected will do much to arouse more generally public interest and to secure the passage of desired legislation.

During the last session of Congress the McRae Bill, H. R. 119, was again passed in the House of Representatives, with amendments, to be sure, which do not meet the approval of your committee,

Nevertheless, we would prefer the passage of the bill for the good that is in it, rather than favor the continued lack of a definite legal status and of all protection for the existing forest reservations, hoping for improvement by later legislation.

In the Senate Mr. Allen has reported and placed on the calendar a bill from the Committee on Forest Reservation (S. 2118), which is in the main the same as the House bill, although with further undesirable amendments added.

The hope of passing this legislation, which would mark a first step towards an administration of the existing forest reservations, during the present session of Congress depends on the willingness of Senator Allen to change his bill in form so that if passed it can be sent to Conference.

Meanwhile, the policy of forest reservations has not only been kept in abeyance, but has become discredited and objectionable with the people in the States where they are situated, since thereby large areas have been absolutely withdrawn from any, even rational use, and are left without protection.

A strong opposition has arisen and strenuous attempts have been made to open for entry or reduce especially the Cascade Range Forest Reserve in Oregon, to counteract which your committee passed and directed to Congress and the Executive the following resolutions:

"WHEREAS, We hear, with regret and apprehension, that an effort is now being made to secure the restoration to the public domain for entry and disposal of three-fourths of the lands, comprising the Cascade Range Forest Reserve in Oregon, which was created only two years ago by proclamation of the President after due and careful consideration, and upon the recommendation of the Secretary of the Interior; and,

WHEREAS, It is the duty of the Government to maintain such conditions as will benefit the greatest number and future generations in their economic development, in which permanent water conditions and timber supplies are essential; and,

WHEREAS, The restoration of these mountain forest lands, which are unfit for agriculture by reason of their ruggedness and altitude, would benefit only a small class, lumbermen and sheepherders, whose occupation of such an area results invariably in the destruction of the forest growth and thereby of favorable water conditions;

*Resolved*, That we deprecate any return to the irrational practice of disposing of these mountain forest lands, and favor a further extension of the policy of reserving from sale the lands of the Government, which are chiefly valuable for timber or for maintaining water conditions;

*Resolved*, That we respectfully ask that the Cascade Range Forest Reserve be not opened in whole or in part, but urge upon Congress the necessity of immediate legislation, which will enable the Secretary of the Interior to permit, under proper regulations and restrictions, the rational and discreet use of all the resources contained in such reservations."

While your committee has held that until proper administration of existing Forest Reservations could be secured, it would be unwise to press an extension of the reservation policy, it now comes to the conclusion that such extension may be useful in that it might make the necessity of providing proper administration more urgent and hasten congressional action.

With this conception your committee transmitted to the President a petition, signed by the Governor and many leading citizens of Utah, for the creation of the Fish Lake Reservation in that State, endorsing the same and recommending early action.

The wisdom of a reservation policy, which means that the Government shoud own and hold in perpetuity forest lands, whose rational treatment is of special importance to the welfare of the community, has also found acceptance and strong advocates in several of the States, notably West Virginia, Minnesota, Wisconsin, New York and Pennsylvania. A resolution of the West Virginia Academy of Sciences asking for co-operation in securing the appointment of a committee by Congress and the several State Legislatures interested for the purpose of inquiring into the question of protecting the forest cover of the middle Alleghenies and establishing an interstate forest reservation in the region was favorably considered by your committee, but it seemed that as long as the Federal Government hesitates to take care of the timberlands which it owns, it could hardly be expected to join in a movement, in which such lands must first be acquired by purchase.

Meanwhile a bill in part, suggested by your committee, has been introduced, reported and advanced to second reading in the Senate of West Virginia to create all lands forfeited to the State for non-payment of taxes in the mountainous counties into a Water and Forest Reserve for the benefit of the State School Fund and to establish a Commissioner of Forestry with forest inspectors to aid him in the care and management of the Reserve.

The Forestry Association of Minnesota has made considerable progress in shaping public opinion in favor of its proposition, that the State form a Forest Reserve, and has formulated the necessary legislation to that purpose.

In Wisconsin a similar proposition by the State Forestry Association has not yet advanced to such definite form.

In New York a determined effort to fill out the area of the projected Adirondack Forest Reserve by purchase is on foot, a special legislative committee having submitted its recommendation for such purpose in connection with the proposed enlargement of the State canals.

The elaborate report of the State Forest Commissioner of Pennsylvania foreshadows early action on the part of that State in acquiring the recommended Forest Reserve, and it is evident from the frequency and generality of favorable newspaper comments, that in that State a well sustained healthy feeling regarding forestry matters has been created by the labors of the energetic Commissioner.

The report of the Chief Fire Warden of the State of Minnesota brings gratifying news regarding the workings of the newly tried organization to suppress forest fires.

It should also be noted with gratification that the Governors of several States, notably those of New York, Pennsylvania and Minnesota refer at considerable length to the necessity of more vigorous measures on the part of their several commonwealths in the direction of forest protection.

Two new State Forestry Associations have been added to the list during the year, namely, one in the State of Connecticut and the other in the State of Washington, and it is gratifying to learn that the first meeting of the latter was held in connection with a lumbermen's convention, which would argue that its work may be laid out on practical lines.

As this report is being written Michigan is preparing to revive her earlier interest in forestry reform. Ottawa County Forestry and Tree Culture Association proposing to make its first annual meeting at Grand Rapids on February 3, the occasion for an effort to resuscitate the Forest Commission of the State, which was abandoned for lack of funds.

From Montana we have signs of the energetic propoganda made by our Vice President, Lieut. Ahern, who hopes to secure effective forest fire legislation and to induce the Agricultural College to take care of its large forest property in a rational manner. In all these movements the indirect, if not a direct influence of co-operation of the Association is felt.

For the conditions of the movement in other States we refer to the second part of our Volume XI of Proceedings, just issued, which contains brief reports from the Vice Presidents of each State.

In educational directions, too, some notable advance has been made, although the measures for the establishment of a post graduate forestry school, in connection with the Department of Agriculure, were not forwarded beyond a hearing before the Committee on Agriculture and Forestry in the H. R., and a report on the bill.

From the University of Washington, at Seattle, we have news of a well planned course of lectures on general forestry topics being instituted. At the Kansas Agricultural College a more specific course on the technical questions of forest planting is successfully carried on. And the State University of Wisconsin provided for a course in the School of Economics, specially designed for students of political economy, which was delivered by your chairman with an attendance ranging from eighty to one hundred and fifty students and professors. Such courses, designed to give a true concep-

tion of the value, significance and nature of our forest resources and of forestry as a business to the advanced student in economics should, it would seem, most quickly be reflected in the legislation on the subject.

It may be appropriate in this connection to refer also as an exhibition of the spread of education on these matters to the resolutions passed by the General Federation of Women's Clubs at Louisville, on May 29, 1896, where several hundred representative women from all parts of the country standing for many thousands of their associates, expressed in well chosen words their approbation of the efforts of this Association.

The political atmosphere of the last year was such that it seemed wise not to attempt the holding of a summer meeting.

The question of publishing a separate periodical journal by the Association was, after much deliberation, deferred for the present and satisfactory arrangements for the continuance of *Forest Leaves* as the organ of the Association were made with a representation of the Association on the staff of editors.

In this connection we are pleased to note that sufficient interest is awakened to warrant the enlargement of the scope and field of the New Jersey Forestry Association's organ, *The Forester*, which has begun its appearance as a regular monthly.

Volume XI of the proceedings of the Association has been printed in three parts, although only two parts have so far been distributed. With this volume all reports of meetings and manuscript matter in arrears have been disposed of.

The membership, as the Secretary's report will show, has in spite of a number of resignations, increased during the year, while the Treasurer's report will show a satisfactory condition of the funds of the Association.

The incorporation of the Association has been effected and the members present at this meeting will have the privilege of electing for the first time the Directors provided by the law and will have to adopt a new Constitution and By-laws, which have been prepared by the Committee to satisfy the requirements of the law. The incorporation is, of course, principally made to enable the Association to accept donations of funds in furtherance of its objects.

That with such funds at its disposal and a paid Secretary, who would devote all his time to the propaganda the forestry movement could be made to advance much more rapidly than now when all the work done must be by voluntary, unpaid exertions of busy men, stands to reason. Perhaps even practical demonstrations in the proper management of forest tracts may eventually become a part of the Association's work, when generous patrons are ready to endow it.

At the last annual meeting the question of affiliation of local forestry associations with this association was discussed and made the subject of an amendment to the By-laws, the Executive Committee being charged to formulate a practical plan. Such a plan has now been formulated, subject to approval by the present meeting, as follows:

Any local, State or other forestry association may upon proper official application and approval of your Executive Committee become affiliated. Such affiliation shall entitle such society to the following representation in this Association: the President and Secretary of the affiliated society shall become enrolled as active members of this Association without payment of dues for the time of their holding office. In addition, for every ten members of the affiliated society, who shall pay $1.00 into the Treasury of this Association and receive therefor the proceedings and journal of this Association, (*Forest Leaves*, at present); one of their number elected or designated by the affiliated society shall become an active member of this Association without charge of dues until his successor is designated.

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